



## Part A - West Thornhill Stormwater Flood Remediation Class EA Study Project Update

Presentation to General Committee March 23, 2009 Asset Management Department

## Part A: Presentation Agenda

- Purpose of the Presentation
- Stormwater Management Strategy Overview
  - Update on Current Studies
  - Completed Work to date
  - Approved Budget
- Stormwater Management Strategy #1 Flood Control
  - Update on Current Studies
  - Town of Markham Areas designed for 2 year stormwater sewer without design for overland flow routes
- Cause of Basement Flooding
- West Thornhill Stormwater Flood Remediation Study
  - Study Area
  - Master Plan / Class EA (Schedule B)
  - Project Schedule
  - Problem Identification
  - Project Status
  - Design Storm Events vs. August 19 2005 Storm
  - Options/Alternatives to be Explored
  - Alternative Solutions
  - Illustration Level of Protection
  - Alternative Solution Level of Protection: 5, 25. 100 year design storm
  - Evaluation Criteria
  - Alternative Solution Cost Estimate, Funding Options
  - Next Steps and Recommendations

## Purpose of the Presentation

- THAT the presentation titled "Part A West Thornhill Stormwater Flood Remediation Class EA Study – Project Status" be received; and,
- THAT Staff be authorized to host Public Information Meeting (PIC) No. 1

## Stormwater Management Strategy Overview



## Stormwater Management Strategy Update on Current Studies

- Flood Control
  - West Thornhill Stormwater Remediation Study ongoing (This study)
  - Thornhill Sanitary Model: ongoing (Part B of this Presentation)
  - Don Mills Channel Capacity Study Underway. PIC #2 planned in Summer of 2009
  - Town Wide Flood Emergency Response Plan (FERP): Phase 3 will be initiated in March 2009
  - Elm Ridge Acre Road Storm Sewer Rehabilitation: construction completed in 2008
- Sanitary Sewer Inflow Reduction
  - See Part B of Presentation
- Erosion Control (Town-wide Erosion Implementation Study)
  - 2 sites construction completed in 2008
  - 3 sites currently under detailed design

## Stormwater Management Strategy Update on Current Studies

- Watercourse Management
  - Pomona Mills Creek Restoration Study ongoing.
     Phase 1 of 4 construction completed.
  - PIC #2 planned in Summer of 2009
- SWM Facilities Retrofit & Maintenance
  - Stormwater Management Facility Maintenance Master Plan – completed
- Policies, standards, guidelines and programs
  - Master Servicing Plan for Growth Management Study: Awarded contract to consultants in February 2009
  - Stormwater Guideline Update ongoing. To be completed in summer 2009

## Stormwater Management Strategy Completed Work to Date

- Repairs to Baythorn Dr. walkway and culverts to Thorny Brae Drive
- Repairs to culvert and walkway crossing Woodland Park to Woodland
   Public School
- Repairs to Proctor Park storm sewer outfall east of Henderson Avenue
- Repairs to Glynnwood stormwater management pond
- Continuously monitored major storm sewer inlets and outlets for blockage and debris
- Inspection and hydraulic analysis of storm culvert between Woodland Park
   and Proctor Park
- Inspection of German Mills watercourse and Don River Tributary to determine rehabilitation of damages
- Continuously clean out catchbasins on flooded street and backyards for west Thornhill area
- Inspection of flooded homes and backyards and CN culverts in west
  Thornhill area
- Investigation of historical drainage paths and legal easements to restore the drainage path altered by home owners

## Stormwater Management Strategy Approved Budget

- Flood Control
  - 2007/2009: \$1.4M Don Mills Ditch/Culvert Rehabilitation
  - 2008: \$0.5M Thornhill Stormwater Flood Remediation Study
  - 2009: \$2.0M West Thornhill storm sewer upgrades
  - 2009: \$1.1M Glynwood Surcharge Sewer Construction
- Sanitary Sewer Inflow Reduction
  - 2009: \$1.06M Sanitary System improvements
- Erosion Control
  - 2008: \$1.8M Town-wide erosion sites
- Watercourse Management
  - 2008/2009: \$0.7M Pomona Mills Restoration
- SWM Pond
  - 2008: \$0.5M Glynwood Pond Maintenance
  - 2008/2009: \$2.0M SWM Pond Maintenance (3 ponds)
- Policies / Guidelines
  - 2008: \$0.2M SWM Rate Study
- Miscellaneous
  - 2009: \$0.3M Storm Sewers Inspection/Maintenance/Rehabilitation
- Total \$11.5M funding available for Storm Water Management Strategy

## SWM Strategy #1: Municipal Survey

- Staff conducted a survey of municipalities on stormwater flood protection
- City of Toronto:
  - Completed flood study for four priority Areas 28 and 29 (areas south of Thornhill), Areas 14 and 31 in 2007/2008
  - Council approved implementation funding \$118.0 million for 4 priority areas
  - Proceeding with detailed design for construction of the 4 priority areas (5 year implementation program)
- Other GTA municipalities (Brampton, Oakville, Richmond Hill, Vaughan) impacted by 2005 Storm are not proceeding to raise the level of protection and did not provide sufficient response to indicate any implementation for stormwater flood protection

### SWM Strategy #1: Flood Control Areas designed for 2 year stormwater sewer without Design for Overland Flow



## **Causes of Basement Flooding**



- Council Authorization September 2007
- Consultant retained March 2008
- Liaison Group initiated in April 2008
  - Two meetings to-date
  - Councillor Valerie Burke (Ward 1), Deputy Mayor Jack Heath, Regional Councillor Tony Wong, Councillor Erin Shapero (Ward 2)
  - Bayview Glen Residents Association, Ward 1S Thornhill Residents Inc., German Mills Ratepayers Association, Grandview Area Resident Association
  - Town of Richmond Hill, City of Vaughan, Region of York, City of Toronto, TRCA



**City of Toronto** 



March 23, 2009

## **Project Schedule**

Task	Sep 07	Oct 07	Jan 08	Mar 08	May 08	Jun – Nov 08	Dec 08	Jan - Feb 09	Mar - Apr 09	May 09	Sum mer 09
Town Staff Activities	Authorize	RFQ	<b>RFP</b>	Award							
Identify problem and alternative solutions				_		-					
Inventory natural, social, economic environments								-			
Identify impacts of solutions on the environment and mitigating measures					-			_			
Evaluate alternative solutions and identify recommended solutions						-					
Select Preferred Solution										Mav	
Public Liaison Committee (PLC)					May 12	Nov 11			<b>X</b> Mar	May	
Gen Committee Presentation/Report					,				Mar	J	une
Public Information Centres (PIC)									A	or	★ June
Class EA Report for Review											

March 23, 2009

## **Problem Identification**

- **Problem Statement:** The west Thornhill area is vulnerable to significant surface and building flooding during severe storm events. Storm flows and volumes during these severe storms exceeded the current storm drainage infrastructure capacity in the area.
- <u>Objective</u>: In response, the Town of Markham initiated in February 2008 a Municipal Class Environmental Assessment study and hired a consulting firm to assess the preferred alternative to improve the storm system performance in West Thornhill to an acceptable level of protection.

## **Project Status**

- Collected & reviewed existing data
- Conducted flow and rainfall monitoring (May to October 2008)
- Completed existing condition analysis
- Determined Storm System Flood Criteria "High Flood Potential"
  - Minor System (sewers): Water levels in storm sewers at or above building basement floor level
  - Major System (surface flow): Surface water levels on streets at or higher than 0.3 m
  - High Flood Potential predicted in computer models may not result in basement flooding
- Developed Options / Alternatives

### Design Storm Events v.s. August 19 2005 Storm Event



March 23, 2009



## **Design Storm Events**

March 23, 2009

## **Options/Alternatives to be Explored**

#### <u>Conveyance</u>

**Replacement of Existing Sewers** 



#### **Oversized Pipes**



#### Source Control



And:

Porous pavement and surface storage

#### End of Pipe – Wet / Dry Ponds



#### Downspout Disconnection

- Installation of inlet control devices and new catch basins/inlets
- •Shrub and Tree Planting

#### Source Control / Conveyance – Underground Storage







#### March 23, 2009

Graphic Source: City of Toronto

## **Alternative Solutions**

- For the entire West Thornhill Area, the following Alternative Solution is considered to maximize the sewer capacity:
  - Downspout disconnection
  - Inlet control devices (to reduce surface flow into storm sewers where capacity is insufficient and flooding occurs)
  - New catchbasins (to increase surface flow into storm sewers where capacity is sufficient)
- Potential new infrastructures (twining sewers, ponds and diversions) are only considered for basement flood prone areas
- The variety of Alternative Solutions will be evaluated for each of the following storm event return periods
  - Do Nothing
  - 1 in 5 year
  - 1 in 25 year
  - 1 in 100 year



# Alternative Solutions – Level of Protection: 5 year design storm



## Alternative Solutions – Level of Protection: 25 year design storm



## Alternative Solutions – Level of Protection: 100 year design storm



## Alternative Solutions Preliminary Cost Estimate

Note: Cost Estimated will vary when other options are considered (e.g. ponds)

Solution Type		Alternative Solution (Level of Protection)								
		5 yr		25yr	100 yr					
Downspout Disconnection	\$	4,000,000	\$	4,000,000	\$	4,000,000				
Flow Balancing – Inlet Controls	\$	2,000,000	\$	2,000,000	\$	2,000,000				
Flow Balancing – New Catch Basins	\$	1,000,000	\$	1,000,000	\$	1,000,000				
New Infrastructure	\$	10,000,000	\$	26,000,000	\$	33,000,000				
All Solutions	\$	17,000,000	\$	33,000,000	\$	40,000,000				

March 23, 2009

## **Evaluation Criteria**

- Evaluation Criteria that will be applied to the Alternative Solutions
  - Natural Environment:
    - Minimize Environmental Impacts and Enhance Environmental Protection;
  - Social and Cultural Environment:
    - Benefit for Future Development
    - *Minimize Construction Disruption/Nuisance*
  - Technical and Engineering Considerations:
    - Reducing Flood Potential
  - Economic Environment:
    - Minimize Construction and Operation & Maintenance Cost

## **Funding Options**

- A fee charged under Section 391 of the Municipal Act, 2001. Cost will be allocated to all benefiting property owners
- Special service charges under Section 326 of the Municipal Act, 2001. Cost will be allocated to all benefiting property owners
- Local Improvement charges in accordance with the Ontario Regulation 586/06 made under the Municipal Act, 2001
- Flat rate or surcharge on water/sewer bill. Cost will be allocated to all benefiting property owners
- Town-wide tax rate increase
- Assistance from Provincial/Federal Grants (based on past experience the grants will only contribute a small portion of the required funding)

March 23, 2009

## Next Steps for West Thornhill Stormwater Flood Remediation Study

- Public Information Centre No.1 (PIC#1) in West Thornhill
  - Present preliminary study findings including alternative solutions
- Evaluation of alternative solutions based on comments received at PIC#1
- Establish funding strategy for the alternative solutions
- Further consultation with Liaison Committee
- Present recommended solution and funding strategy to General Committee
- Host PIC#2
- Finalize Class EA / Master Plan Report for review / comment by public and agencies (30 day review period)

## Recommendations

- That the presentation titled "West Thornhill Stormwater Flood Remediation Study, Class EA Study Project Update" be received, and
- That staff be authorized to host Public Information Meeting (PIC) No. 1 to present the existing conditions and alternative solutions
- Questions / Comments?
  - Yanli Xu, Senior Stormwater Engineer, x. 2894